NON-PUBLIC?: N
ACCESSION #: 9507200152
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Calvert Cliffs, Unit 1 PAGE: 1 OF 5

DOCKET NUMBER: 05000317

TITLE: Manual Trip due to Loss of 12 Steam Generator Feed Pump
EVENT DATE: 06/16/95 LER #: 95-002-00 REPORT DATE: 07/14/95

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
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Compliance Unit

COMPONENT FAILURE DESCRIPTION:
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:
REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

On Friday, June 16, 1995 at 1917 hours, Calvert Cliffs Unit 1 was manually tripped following the loss of the 12 Steam Generator Feed Pump (SGFP). Following the reactor trip, 11 SGFP tripped on high discharge pressure and the Auxiliary Feedwater Actuation System automatically actuated.

The root cause of this event was degradation of the 12 SGFP overspeed trip mechanism due to wear over many years.

The overspeed trip mechanism was repaired and Unit I restarted. The preventive maintenance procedure for overhauling the SGFP was revised to require examination of the trip mechanism. A review will be conducted to identify similar configurations and verify appropriate preventive maintenance. The circumstances of this event will be factored into an ongoing effort to improve the preventive maintenance program.

END OF ABSTRACT



## I. DESCRIPTION OF EVENT

On Friday, June 16, 1995 at 1917 hours, Calvert Cliffs Unit 1 was manually tripped following the loss of the 12 Steam Generator Feed Pump (SGFP). Following the reactor trip, 11 SGFP tripped on high discharge pressure and the Auxiliary Feedwater Actuation System (AFAS) automatically actuated. Once core heat removal was assured and a positive steam generator level trend was noted, auxiliary feedwater (AFW) was secured. Unit 1 was operating in MODE 1 at 100 percent power at normal operating temperature and pressure at the time of the trip. Unit 2 was not affected.

At approximately 1915 hours, operators received indication that the 12 SGFP had tripped. They tried more than once to reset the pump. These attempts were unsuccessful and a manual trip was initiated once steam generator low level pre-trip indication was received. Shortly thereafter, 11 SGFP tripped on high discharge pressure. The operators started 13 AFW pump to ensure heat removal from the core. Within a few seconds, AFAS initiated. Once steam generator level stabilized, the operators secured AFW. Emergency operating Procedures EOP-0, "Post-Trip Immediate Actions," and EOP-1, "Reactor Trip," were implemented, respectively.

An investigation commenced into the cause of the 12 SGFP trip. Since no electrical trip alarm was present at the local SGFP panel, the investigators concluded that the trip was mechanical in nature. Since computer printouts indicated that 12 SGFP never got within 1000 rpm of the overspeed trip setpoint, the most likely cause was determined to be spurious actuation of the overspeed trip mechanism.

The overspeed trip mechanism (see Figure 1) consists of a lever arm placed near the SGFP turbine shaft. A plunger mounted on the turbine shaft is Bet to extend as a result of centrifugal force caused by the shaft's rotation and is held in place by a spring. When the shaft reaches the overspeed trip setpoint, the centrifugal force overcomes the spring force holding the plunger in place and it strikes the lever arm, causing it to rotate, releasing the trip plunger, which drops, shutting the steam stop valves. inspection of the trip mechanism found degradation sufficient to account for spurious actuation of the mechanism.

Repairs were made to the 12 SGFP trip mechanism. 11 SGFP was inspected and determined not to have a similar problem. The Unit 2 SGFPs were determined to be sufficiently different in design as not to be susceptible to a similar problem. The unit was restarted on June 21, 1995.

II. CAUSE OF EVENT

The investigators found that the contact points on the trip plunger and the lever arm were worn down (see Figure 2), resulting in a "hair trigger' configuration in which relatively little vibration could cause the plunger to slip off the lever arm seat. This wear appeared to be the result of equipment



aging. The condition of the overspeed trip mechanism had not been reviewed during overhauls of the pump over the life of the plant since there was no recommendation from the manufacturer to do so and the mechanism had not been identified as needing preventive maintenance. There was no history of problems with wear of these parts company wide.

III. ANALYSIS OF EVENT

There were no safety consequences associated with this event. The reactor shut down as designed upon receipt of the manual trip signal. Performance of the plant was within the assumptions of the safety analysis.

This item is reportable under the provisions of 10 CFR 50.73(a)(2)(iv) as an engineered safety features actuation.

IV. CORRECTIVE ACTIONS

A. The sharp edges were restored to both the trip plunger and the lever arm. The mechanism was tested satisfactorily and replaced prior to plant startup.

B. Once replacement parts arrive, a destructive test will be performed on the trip mechanism to determine if a materials problem was responsible for the extent of wear on the parts.

C. The Preventive Maintenance procedure for overhauling the SGFP Turbine was revised to require examination of the trip mechanism. A review will be conducted to identify similar configurations in other equipment and verify appropriate preventive maintenance.

D. The circumstances of this event will be factored into an ongoing effort to improve the preventive maintenance program.

V. ADDITIONAL INFORMATION

A. Affected Component Identification:

IEEE 803 IEEE 805
Component or System EIIS Funct System ID

Main Feed Pump P SJ
Overspeed Trip Device 12 SJ

B. Previous Similar Events:

There have been no events reported via Licensee Event Report involving reactor trips caused by worn mechanical parts.



Figure 1 "OVERSPEED TRIP DEVICE Not to Scale" omitted.



Figure 2 "DETAIL OF WEAR ON LEVER ARM/TRIP PLUNGER CONTACT POINTS Not to
Scale" omitted.



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July 14, 1995

U.S. Nuclear Regulatory Commission
Washington, DC 20555

ATTENTION: Document Control Desk

SUBJECT: Calvert Cliffs Nuclear Power Plant
Unit No. 1; Docket No. 50-317
Licensee Event Report 95-002
Manual Trip Due to Loss of 12 Steam Generator Feed Pump

The attached report is being sent to you as required under 10 CFR 50.73 guidelines. Should you have questions regarding this report, we will be pleased to discuss them with you.

Very truly yours,

CHC/DWM/bjd

Attachment

cc: D. A. Brune, Esquire
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